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DESIGN CONSIDERATIONS FOR THE INSTRUCTIONAL PROGRAM OF OPERATION PEP.

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THIS PAPER DISCUSSES THE OBJECTIVES AND NECESSARY DESIGN CONSIDERATIONS FOR THE INSTRUCTIONAL PROGRAM OF OPERATION PEP. THERE ARE NINE ELEMENTS WHICH THE INSTRUCTIONAL PROGRAM OF OPERATION PEP MUST CONSIDER--(1) PRIMACY OF IMPROVED PARTICIPANT PERFORMANCE, (2) CRITICALNESS OF TIME, (3) DETERMINATION OF PRIORITIES AMONG RELEVANT EDUCATIONAL PLANNING AND MANAGEMENT TRAINING CONCEPTS, (4) FOCUS UPON IMPROVED EDUCATION FOR K-12 STUDENTS, (5) REALIZATION OF THE OBJECTIVES OF CONTROLLED INVESTIGATION, (6) RECOGNITION OF THE ROLE OF PARTICIPANTS IN INSTRUCTIONAL PROGRAM DESIGN, (7) SET AND CLUSTER ANALYSIS, (8) TERMINAL PERFORMANCE SPECIFICATIONS, AND (9) DERIVATION OF INSTRUCTIONAL SYSTEM DESIGN MODEL. ELEMENTS FOR CONSIDERATION IN INSTRUCTIONAL UNIT DESIGN AND LESSON DESIGN ARE OUTLINED. FINALLY, VARIOUS ASPECTS OF INFORMATION HANDLING PROCESSES ARE CONSIDERED--(1) THE ROLE OF OPERATION PEP PARTICIPANTS IN INSTRUCTIONAL PROGRAM DESIGN, (2) FACILITATING PARTICIPANT ROLE FULFILLMENT, AND (3) SOLICITING AND RECORDING PARTICIPANTS' RESPONSES AND SUGGESTIONS. (HW)

Orientation

ED020586

November 1967

Prepared by:

The Staff of OPERATION PEP

OPERATION PEP

I Orientation

DESIGN CONSIDERATIONS FOR THE INSTRUCTIONAL PROGRAM OF OPERATION PEP

BY

Donald R. Miller, Project Director
OPERATION PEP: A State-wide Project to
Prepare Educational Planners for California

October 25, 1967

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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I

OBJECTIVES FOR THE OPERATIONAL PHASE OF OPERATION PEP

This project is planned to continue over a three-year period and is designed to:

1. Identify and define key educational planning functions.
2. Develop models relative to planning and managing the educational planning function.
3. Determine what skills and competencies are required by educational planners and managers.
4. Design an instructional program for training educational planners and managers.
5. Specify relevant educational planning and management resources.
6. Implement a training program for educational planners and managers.

Experience in the development of similar instructional programs has shown the need for iteration and revision of the instructional materials and techniques before desired levels of performance have been reached.

For the foregoing reason, the specific objectives for the first year of OPERATION PEP are limited to:

1. Preparing one hundred key educators in California to use a "system approach" to educational planning and management.
2. Preparing an updated instructional system design by utilizing the methods, procedures, skills and knowledges developed in the training program.
3. Evaluating the success of the instructional program in terms of its stated objectives.
4. Evaluating the project design in order to re-assess the desirability of its initial objectives.

II

PROJECT RATIONALE

The problem is clear and specific: How can our schools prepare our students for the kind of a world they must live in? We are ineffective because we fail to plan adequately the accommodations demanded by our changing society.

True, this statement has been repeated throughout the history of education. It is true, too, that today's schools are changing--improving--faster than ever before. But never before has change been so imperative, for both the pace and the direction of change now confronting us are without precedent in the experience of mankind.

These changes have profound implications for our schools, for we deal with the future perforce. And to an extent never true before, our schools represent the singular mechanism in our society for developing the human capacities which these changes demand.

The validity of this viewpoint is abundantly documented by virtually every edition of every news medium, by the drop-out (push-out?) rates of our schools, and by objective educational research as well as by the emotional concerns of a growing number of parents, employers and, indeed, students themselves.

The political, economic, social, cultural, and technical influences on our schools require educational systems which can meet new demands, assume new roles, and offer new content through new instructional techniques and new learning situations.

Accomplishing educational change is particularly difficult and complex in California where educational decisions are made by the

120-member legislature, by the 10-man State Board of Education, by the 58 county superintendents, and by governing boards and administrative officers of some 1,200 independent local school districts.

This means that there is a need at all levels of public education in California for continuous and comprehensive educational planning based upon an orderly rationale for educational improvement. The technology which created this problem can be used to assist in solving it.

III

THE ROLE OF PARTICIPANTS IN THE 1967-68 PROGRAM YEAR OF OPERATION PEP

Participants in OPERATION PEP represent the "real-world" of educational planning and management; and therefore, they represent a key factor in the successful achievement of project objectives. Each participant's performance will furnish instructional program designers with a better understanding of the functional requirements for educational planners and managers. This information can be used to perfect a more successful instructional system. Each participant will be actively involved in the derivation and specification of relevant performance requirements, objectives, conditions and criteria for the instructional program of OPERATION PEP.

The system approach to educational planning and management is best performed by an integrated team of skilled professionals. The task force approach to be used in OPERATION PEP consists of representatives from three groups; namely, the OPERATION PEP staff, technological consultants and the participants. OPERATION PEP represents an effort, on the part of the educational community in California, to perfect an instructional program for educational planners and managers. The final design of the instructional program must be responsive to the defined and valid needs of practicing educational planners and managers.

IV

INSTRUCTIONAL DESIGN CONSIDERATIONS

Program Design Consideration

The instructional program of OPERATION PEP must realistically provide for each of the following general design considerations:

1. Primacy of Improved Participant Performance. The training program will be identified as beneficial only to the degree that representative agencies value and utilize the improved performance capabilities of participants. Thus, the program will be judged effective to the extent that it makes each participant more successful in the fulfillment of his professional role.

   Basic to any judgment of performance effectiveness is the requirement for a clear definition of the professional role and performance being judged. Thus, the program must train each participant to define the performance requirements of his professional role. In addition, a set of behavioral objectives must be developed for the instructional program which will be compatible with the performance requirements of the specific professional roles being fulfilled by the participants.

2. Criticality of Time. Educational planners and managers are busy people who are valued by their representative agencies. The instructional program must be designed to achieve maximal benefits in minimal time spans without jeopardizing anticipated instructional and/or learning outcomes.

   A detailed instructional system design model is required in order that the instructional staff will be provided with an objective decision-making referrent. The staff must make effectiveness and efficiency trade-offs between: (1) the time constraints on training and the behavioral objectives to be achieved; (2) the levels of skill mastery desired and the participants' "need to know" and "need to do" performance requirements; and (3) the average rates of learning achievement expected of participants and the sequencing, mixing and application of methods, procedures, skills and knowledges.

3. Determining Priorities Among Relevant Educational Planning and Management Training Concepts. Priorities among educational planning and management concepts can be established on the basis of both relevancy and pertinency. In addition, each lesson component must be designed to achieve its maximal probable value as an instructional instrument. Each lesson should make a logical and sequential contribution to the predictable achievement of participants.

   The instructional program design must be based upon a detailed instructional system design model (as previously mentioned). In addition to the model, a detailed list of interim and terminal performance specifications must be formulated to maintain congruity and compatibility between instructional program components and the terminal performance required by participants. Further, design specifications must be developed to assure the most efficient sequencing, mixing and application of concepts, principles, procedures, methods, skills and knowledges along the intended learning path. Finally, the integrated design must be internally consistent in order that it can be maximally effective in producing the desired levels of terminal performance.

4. Focusing Upon Improved Education for K-12 Students. OPERATION PEP is a PACE project funded under provisions of the Elementary and Secondary Education Act of 1965 (P.L. 89-10). The primary reason for desiring to improve the performance capabilities of project participants relates directly to PACE concepts and the need for improved educational programs of K-12 students.

   This consideration necessitates that the instructional program of OPERATION PEP establish and maintain educational planning, management and curriculum orientations. Since the content of the instructional program is oriented to educational planning and management, the first two considerations are assured. The staff of OPERATION PEP will attempt to demonstrate curricular implications to each participant as he experiences the totality of learning activities presented in the instructional program.

5. Realizing the Objectives of Controlled Investigation. OPERATION PEP is designed as a controlled investigation. Thus, each component must contribute to, and be logically consistent with, the pre-stated objectives of the project. In addition, each lesson component must be designed to provide evaluative information in terms of pre-stated lesson objectives and criteria.

6. Recognizing the Role of Participants in Instructional Program Design. The reactions of participants through continuous feed-back mechanisms is absolutely essential for all phases of instructional program design. The participants represent the "real-world" of educational planning and management, and their contributions serve as a basis for program revision requirements.

   This consideration is vital to both the design and success of OPERATION PEP. The project represents an attempt, on the part of professions from the educational community in California, to design a new type of training program for educational planners and managers. The participants in OPERATION PEP are recognized as content specialists and qualified to participate in content design and the structuring of terminal performance specifications for the training program. A controlled feed-back procedure has been prepared to facilitate participant involvement in program design.

7. Set and Cluster Analysis. The instructional program of OPERATION PEP has been designed using a framework of educational planning and management principles and concepts. The statistical processes of cluster analysis show how certain significant sets or groups of concepts are related--i.e., "cluster"--to produce measurable instructional benefits. Thus, three significant levels of principles and concepts can be analyzed; namely, program, unit and lesson.

8. Terminal Performance Specifications. The terminal performance specifications for participants in the 1967-68 program year of OPERATION PEP are compatible with the objectives and procedures of the project. Each participant should possess:

   a. The ability to specify performance requirements, objectives, criteria and conditions.

   b. A functional knowledge of the system approach to educational planning and management.

   c. A functional knowledge of how the systems approach may be applied to educational problems. This functional approach would include familiarity with methods, procedures, skills and knowledges relevant to developing:

      I. An awareness and sensitivity to change and/or a need for change.

II. The ability to specify new educational goals and/or to redefine existing goals.

III. The identification and definition of problems and change contexts.

IV. The selection and analysis of a priority educational problem and its change context.

V. The derivation of performance requirements for the resolution of a problem.

VI. The selection and/or generation of alternative solution methods and strategies to resolve a problem.

VII. The testing and verification, as to feasibility and practicality, of solution methods and strategies.

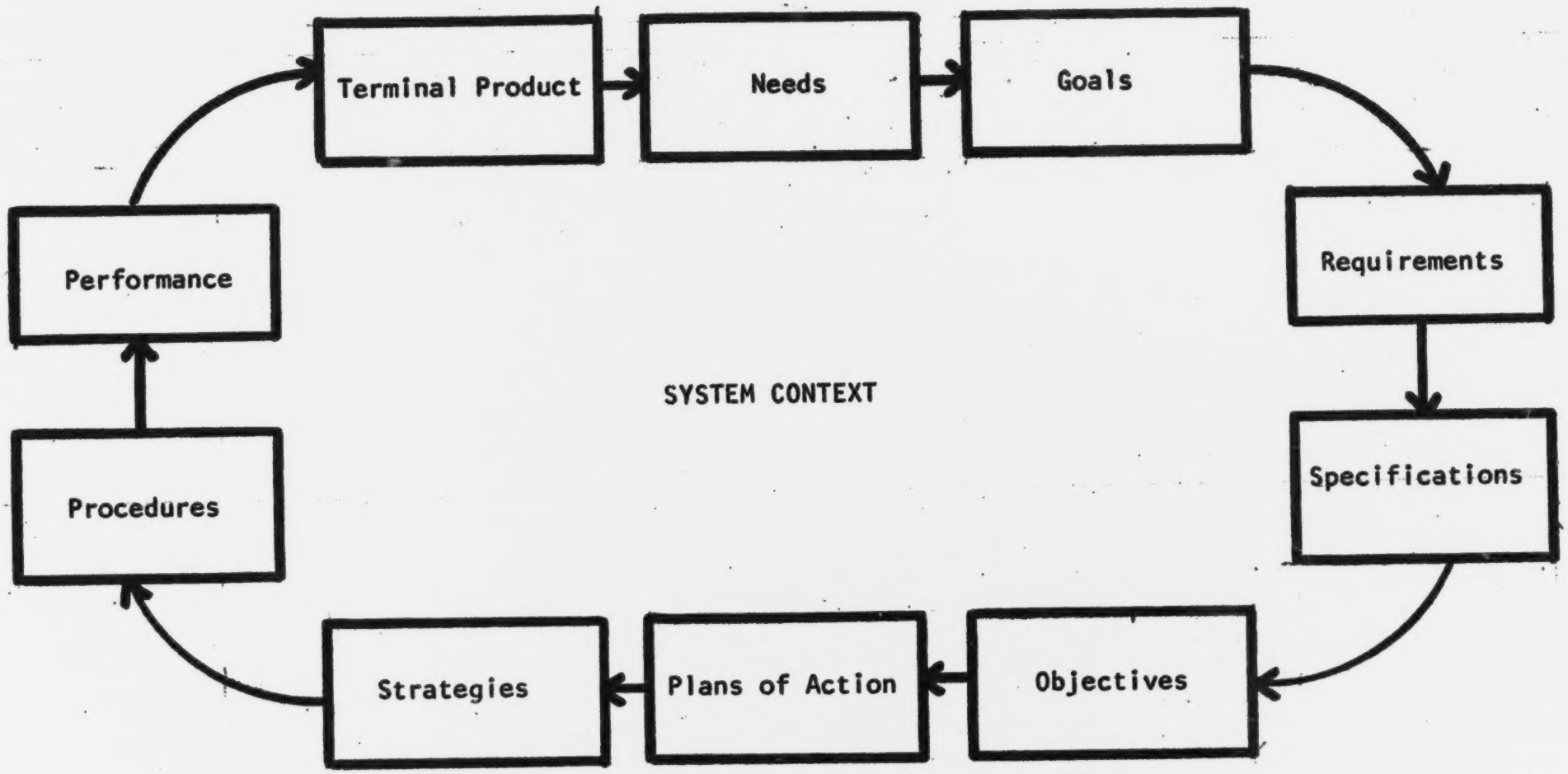
VIII. The selection and implementation of the priority solution method and strategy for resolving a problem.

IX. The evaluation of the performance effectiveness of the implemented solution method and strategy.

X. The utility of feed-back and iteration procedures in the evolution of reliable products and the maintenance of quality assurance controls.

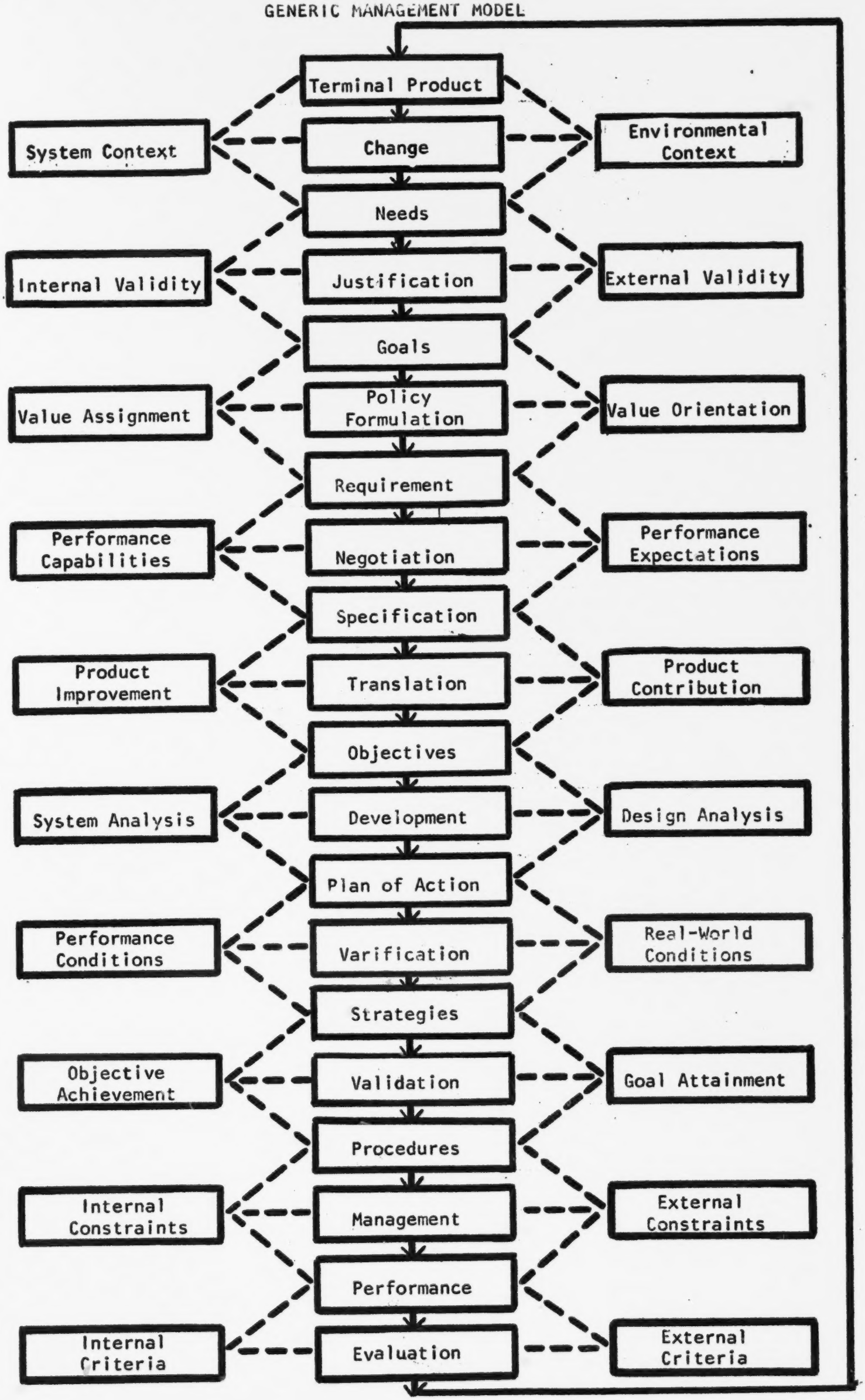
9. Derivation of Instructional System Design Model. Central to any instructional program design is the requirement that it facilitate the learning process. Central to the learning process is thinking and problem-solving. For these reasons, the instructional system design will be developed using: (a) a management model; (b) a problem-solving model; and (c) a framework for the instructional program.

A GENERIC MANAGEMENT MODEL

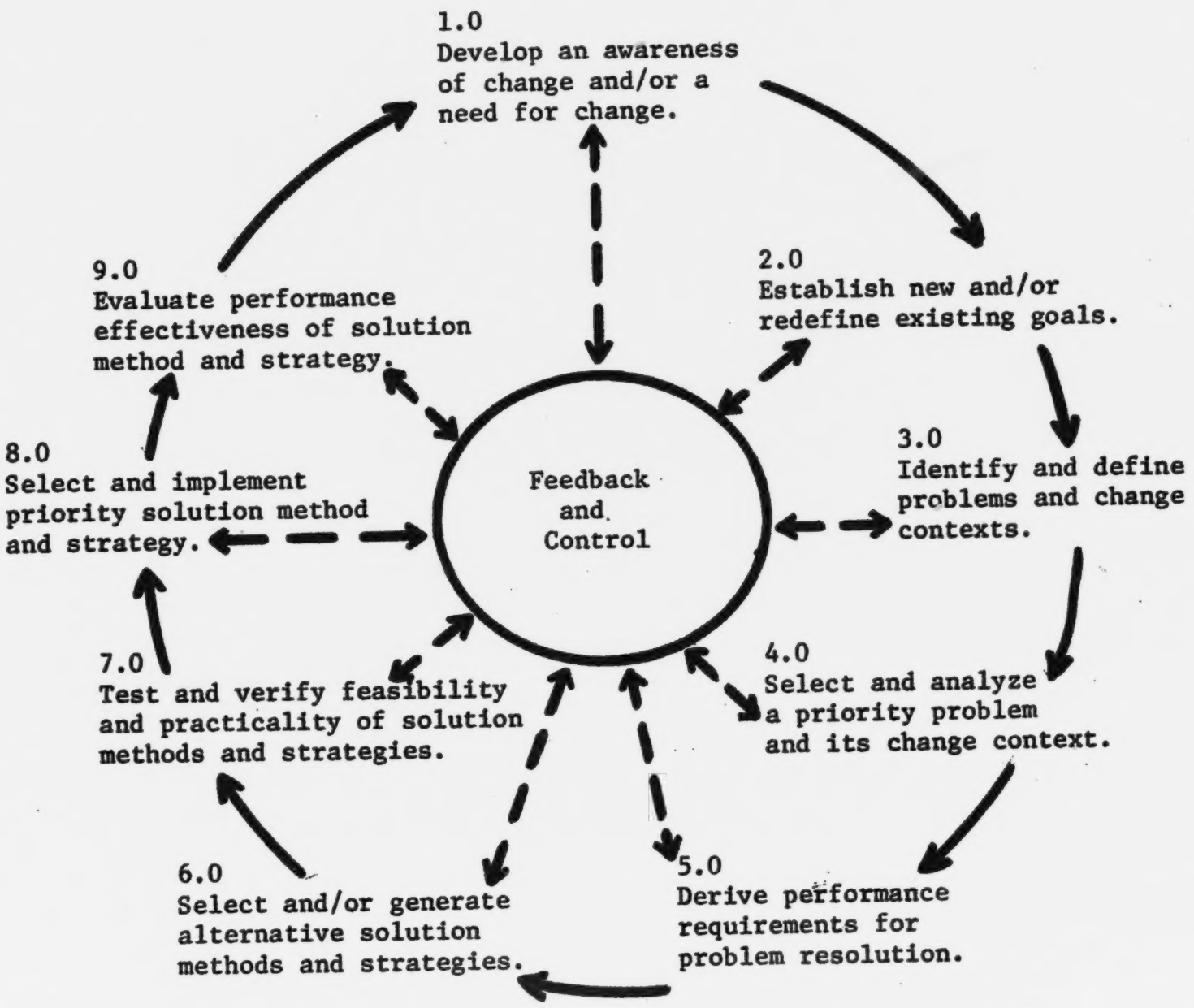


ENVIRONMENTAL CONTEXT

GENERIC MANAGEMENT MODEL



A MODEL OF A SYSTEM APPROACH TO PROBLEM SOLVING


1.0
Develop an awareness of change and/or a need for change.
2.0
Establish new and/or redefine existing goals.
3.0
Identify and define problems and change contexts.
4.0
Select and analyze a priority problem and its change context.
5.0
Derive performance requirements for problem resolution.
6.0
Select and/or generate alternative solution methods and strategies.
7.0
Test and verify feasibility and practicality of solution methods and strategies.
8.0
Select and implement priority solution method and strategy.
9.0
Evaluate performance effectiveness of solution method and strategy.
Feedback and Control

An examination of the model reveals that:

- the model is a "closed-loop" logic system.
- evaluation data "feeds-back" to every step to facilitate continuous revision and analysis of products.
- an iteration loop exists between each component of the system and every other component facilitating "check-back", feed-back, and verification procedures.

INSTRUCTIONAL SYSTEM DESIGN MODEL

LEVEL OF PROFICIENCY	INSTRUCTIONAL AREAS: Training Program Orientation	Design and Assessment Structures	System Analysis and System Synthesis	Management and Control Sub-Systems	Network-Based Management Sub-Systems	Planning, Programing Budgeting Sub-Systems	Cost/Benefit and Cost/ Effectiveness Analysis	Environmental Analysis Need Assessment	Technical Procedures in Educational Planning	Planned Change in Education	Informational Based Sub-Systems	Modeling and Simulation	
Theory (Value Integration)													
Principles and Concepts													
Functional Knowledge (Application)													
Skill Development													
Evaluation (assessment of performance in terms of all levels of proficiency)													

Unit Design Considerations

Each instructional unit in the educational planning and management training program must be designed in terms of the following considerations:

1. Pre-stated Objectives and Criteria. Performance objectives, conditions and criteria must be specified for each instructional unit. The participant must be made aware of the interim and terminal behaviors expected of him. In addition, he should be aware of the standards which are to be used to judge his performance. Thus, the objectives, conditions and criteria must be specified before the lesson is introduced as a unit of instruction.

2. Structured Pre-Tests and Post-Tests. The measurement of improved performance requires the use of pre-tests and post-tests which have been structured in terms of pre-stated unit objectives and criteria. Identified point-score differentials serve as measures of changes in performance.

3. Cognitive Levels of Performance. All unit performance objectives, criteria and tests must focus upon, and be congruent with, the levels of cognitive behavior expected of the participant. It is essential that all tests reflect an honest balance among the cognitive levels of performance anticipated in the unit design.

4. Appropriate Levels of Generality. The instructional design used for each unit must allow participants to move easily from the general to the specific, and vice versa, recognizing the general principle that covers a number of specifics. Appropriate levels of generality can be achieved using case studies, problems and/or examples, but in each instance of use they must be revealed in the instructional program. Specifics can then be used as illustrations without any danger of their being regarded as ends in themselves.

5. Instructional Unit Strategy. The strategy for an instructional unit must reveal its primary intent by: (a) defining exactly what it is we want the learner to know and to do on completion of the unit, (b) stating how his achievements will be measured and (c) specifying the conditions under which he will perform.

6. Units of Instruction and Reference. Upon completion of the training program, participants will need a variety of reference materials to reinforce their efforts in educational planning and management. Each unit of instruction must provide supplementary information in addition to a complete set of instructional materials. Thus, each unit of instruction must be designed to serve as a component in a Reference Handbook for Educational Planners and Managers.

Lesson Design Considerations

Each lesson component used in the OPERATION PEP training program must be consistent with the considerations stated previously. In addition, all lessons should provide for the following design considerations:

1. Structured Presentations. OPERATION PEP participants are skilled and competent professional educators possessing marked abilities to deal with concentrated technical information, concepts and other abstractions. Each lesson should be characterized by the level of literal treatment required for the development of an understanding of the concepts and generalizations being presented.

2. Conceptual Strategy and Framework. The instructional program of OPERATION PEP features a design based upon interacting and related educational planning and management concepts from the twelve areas of instruction. Each lesson must be based upon a conceptual strategy which builds relationships between concepts and generalizations. Thus, a lesson must contribute to each participant's awareness of the overall conceptual framework. This can be accomplished using the following steps:

   a. Define the generalization to be presented in the lesson.

   b. Select key concepts which are essential for an understanding of the generalization.

   c. Arrange the concepts in a logical order which presents an approach structure and provides a basis for instructional continuity.

   d. Reveal all conceptual strategies utilized in lesson development to participants at the most appropriate time in the instructional process.

   e. Determine which concepts are "known" and which concepts must be developed; either partially or completely.

   f. Establish relationships between concepts to stimulate concept analysis and synthesis of meaning.

   g. Create a clear understanding of the generalization by relating it to specific cases and other illustrations.

   h. Emphasize the significant relationships existing between the content of the lesson being presented and the content of lessons previously presented and/or anticipated. Stress relationships between concepts and generalizations.

i. Provide evaluative experiences which stimulate self-evaluation on the part of individual participants.

j. Present a terminal challenge which stimulates participants to: (1) think about additional situations and conditions for applying concepts and generalizations, (2) engage in discussions of the lesson content presented, (3) anticipate the next lesson, (4) structurally relate concepts and generalizations, (5) synthesize new approaches and problem-solving strategies, (6) communicate more effectively, (7) handle information more efficiently and (8) anticipate and adapt to changes.

3. Communication Requirements. Each lesson must be designed to present the essential information, education and motivation required for the achievement of pre-stated levels of performance. Only relevant and pertinent information should be presented in an effort to achieve conciseness in the presentation. Each participant should be provided education regarding the most effective and efficient use of the information presented. Finally, each lesson must develop the necessary levels of motivation required by participants before they will use the information to improve their planning and management performance.

4. Lesson Presentation Format. Each lesson in the educational planning and management training program should be designed in terms of a common format. The following lesson presentation outline is suggested:

a. An uninterrupted twenty-minute presentation of the lesson gestalt.

b. A ten-minute presentation which reveals how the lesson content can be applied to problem situations. An exemplary problem analysis will be performed by the instructor in order that participants can observe the possible benefits which can be derived through involvement.

c. A ten-minute presentation which provides participants with an analytical insight to the pertinent concepts, generalizations, methods and skills introduced by the instructor.

d. A twenty-minute problem analysis trial by each participant which will facilitate his application of lesson content to exemplary problems under the supervision of the instructor.

e. A twenty-minute discussion of the results achieved by individual participants and the development of a composite problem solution by the entire group.

f. A ten-minute evaluation session designed to facilitate lesson closure and group consensus. This period will end with the issuance of an appropriate challenge for the participants.

The above described format may not be applicable for all instructional situations. This may be especially true when the instructional performance requirements are central to the development of technological skills. In such cases, more time would be required for practicum situations in which each participant is afforded time to develop a particular skill in an instructional situation which features available consultant and reference services.

5. Method and Style of Presentation. The method and style of lesson presentation must be consistent with the pre-stated objectives, performance conditions and criteria established as guides for the participants' performance. Since both method and style of presentation depend, in large measure, upon the creativity of the instructors, both should be held flexible. Yet, in spite of this need for flexibility, the following considerations must be observed:

   a. The method and style of presentation must be consistent with accepted instructional theory and methodology.

   b. A highly literal treatment must be maintained using a vocabulary which is consistent and meaningful in terms of the participants' frames of reference.

   c. The instructional process should feature those methods and styles which facilitate maximum visualization of concepts and generalizations. Every abstraction should be introduced using a graphic presentation which is supported by exemplary problems, case studies, models, visuals and stories which are meaningful in the educational context.

V

INFORMATION HANDLING PROCESSES

General Design Consideration

The design and development of the OPERATION PEP training program requires feed-back from the participants. Information from the participants must be regarded as being central to design activities and ultimate participant satisfaction with the training program. Instructional strategies, procedures, content, methods, means and media will be modified, on a continuous basis, using their professional insight and evaluation. Thus, information handling processes must strategically facilitate the collection, manipulation and transmission of information, whatever its use is to be in instructional program design and development.

All participant responses must be continuously solicited and recorded as they are spontaneously produced by each participant as he interacts with an instructional stimuli. The act of recording his reactions, responses and suggestions will motivate the participants to extrapolate the instructional content with other relevant information which may have been overlooked during the course of design. Thus, the information handling processes facilitate the establishment of basic congruence between the instructional content and the developmental states of knowledge and expertise in the "real-world" of educational planning and management.

Three information handling processes have been structured to facilitate the collection of feed-back information. Each process

involves the participants in pertinent activities of instructional program design. Each process has been designed to provide relevant feed-back for analysis and revision of the instructional program design. Thus, the processes are designed to collect, manipulate and transmit data on each participant's performance in a professional role, reactions to instructional stimuli, and his suggestion of appropriate contingency responses. Each process will be discussed in relation to appropriate models.

Role of OPERATION PEP Participants in Instructional Program Design

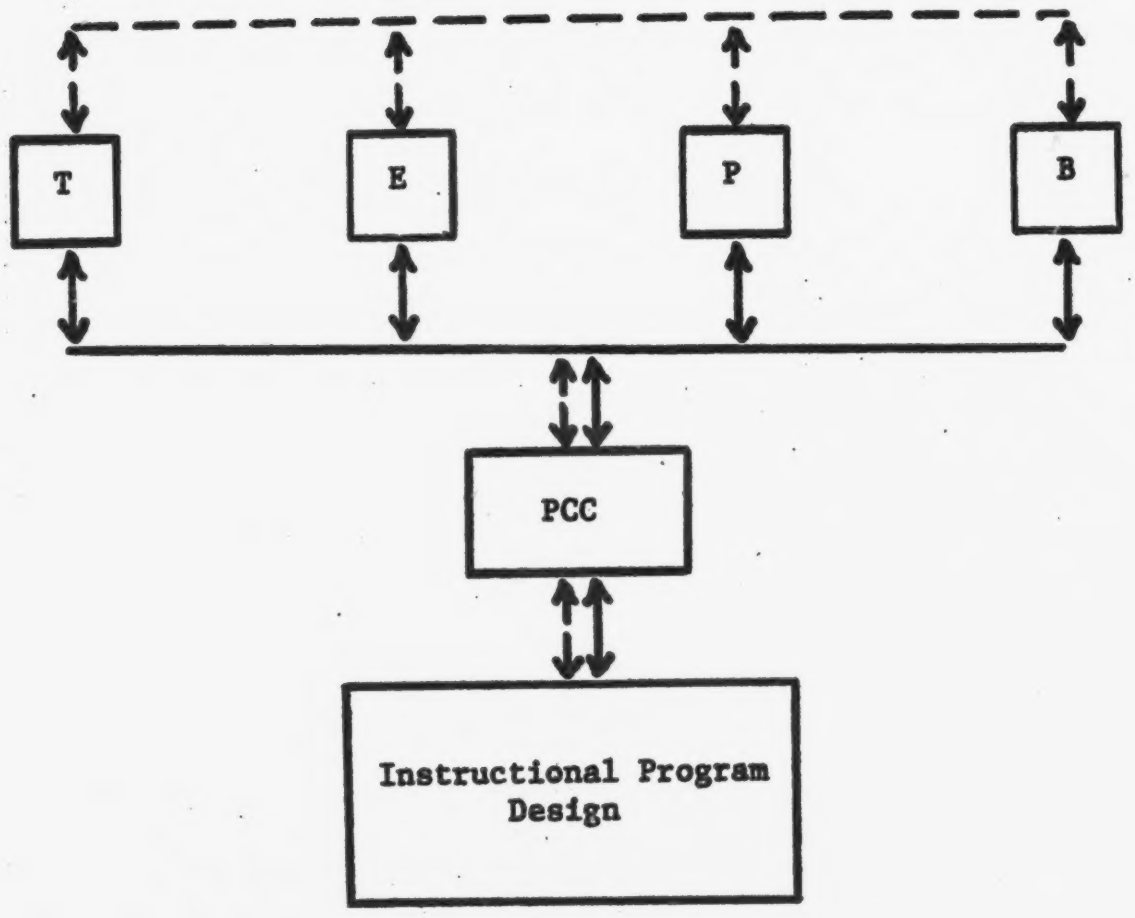
OPERATION PEP participants can be characterized as being successful professional educators sharing career expectations. Every participant possesses unique capabilities and capacities which have contributed to his past achievements. The experiential and professional training backgrounds of each participant have also conditioned his performance effectiveness. Each possesses unique personality characteristics which are reflected by his demonstrated behavior.

The performance capabilities and capacities of individual participants are an integral function of a unique set; namely, training, experience, personality and behavior. Elements of this set overlap in some dimensions but each bears a direct relationship to the performance capabilities and capacities of individual participants.

FIGURE 1 reveals that each has a definite role in the design of the instructional program. The final design utilized in the development of instructional materials and the presentation of the instructional program will be decided, in large measure, by the continuous feed-back information supplied by participants. This information, when corroborated by evaluative data, will determine the final form of the educational planning and management training program.

FIGURE 1

ROLE OF OPERATION PEP PARTICIPANTS
IN DESIGN FORMULATION



PCC = Performance Capabilities and Capacities

T = Professional Training Background

E = Professional (Relevant)
Experiential Background

P = Personality of Participant

B = Demonstrated Behavioral Characteristics

Facilitating Participant Role Fulfillment

Two serious role-related deficiencies were identified by the initial participants in OPERATION PEP. First, the participants revealed that they were unable to make their chief administrative officers aware of their new capabilities. This condition produced considerable frustration on the part of the participants and made it impossible for the participants to utilize the tools they had developed in the training program.

The second deficiency cited by initial project participants was the lack of commitment on the part of several participants and representative agencies with respect to the training program. This deficiency produced many compromising situations in which it was easy for participants to depreciate the importance of the training program.

In order to overcome these two deficiencies, the design of the 1967-68 training program was changed as follows:

1. The nomination of candidates to the 1967-68 training program was designed to include the use of a formal nomination form which required signatures of commitment by the chief administrative officer and/or the superintendent of schools and the candidate himself (see FIGURE 2).

2. A model of relevant instructional design relationships for OPERATION PEP was designed and is revealed as FIGURE 3. The model is self-explanatory but it should be noted that it facilitates interaction between the chief administrative officer and the representative participant. In addition, it features interaction between the chief administrative officer and the project. These interactions have been designed to create more favorable conditions for participants in their professional roles.

FIGURE 2

Nomination of Candidates for
Participation in the Training Program
of OPERATION PEP

Please accept the nomination of _____

as a candidate for participation in the 1967-68 training program of OPERATION PEP. The candidate has been asked to represent_____

_____ (Name of educational agency) in the training program.

Date:_____ _____
Chief Administrative Officer

If the candidate is other than the Superintendent, then the Superintendent agrees to participate in evaluation of the training program for OPERATION PEP by conducting, upon the completion of each training phase, a one-hour conference with the participant. (The Superintendent will be provided with a discussion format for these conferences by the staff of OPERATION PEP.)

Date:_____ _____
Superintendent

The candidate agrees to participate in all phases of the training program of OPERATION PEP, and he is fully aware of the time and study requirements involved for the successful completion of the program.

Date:_____ _____
Name of Candidate

_____
Title of Candidate

Please indicate the complete address to which the candidate desires application forms be sent.

_____

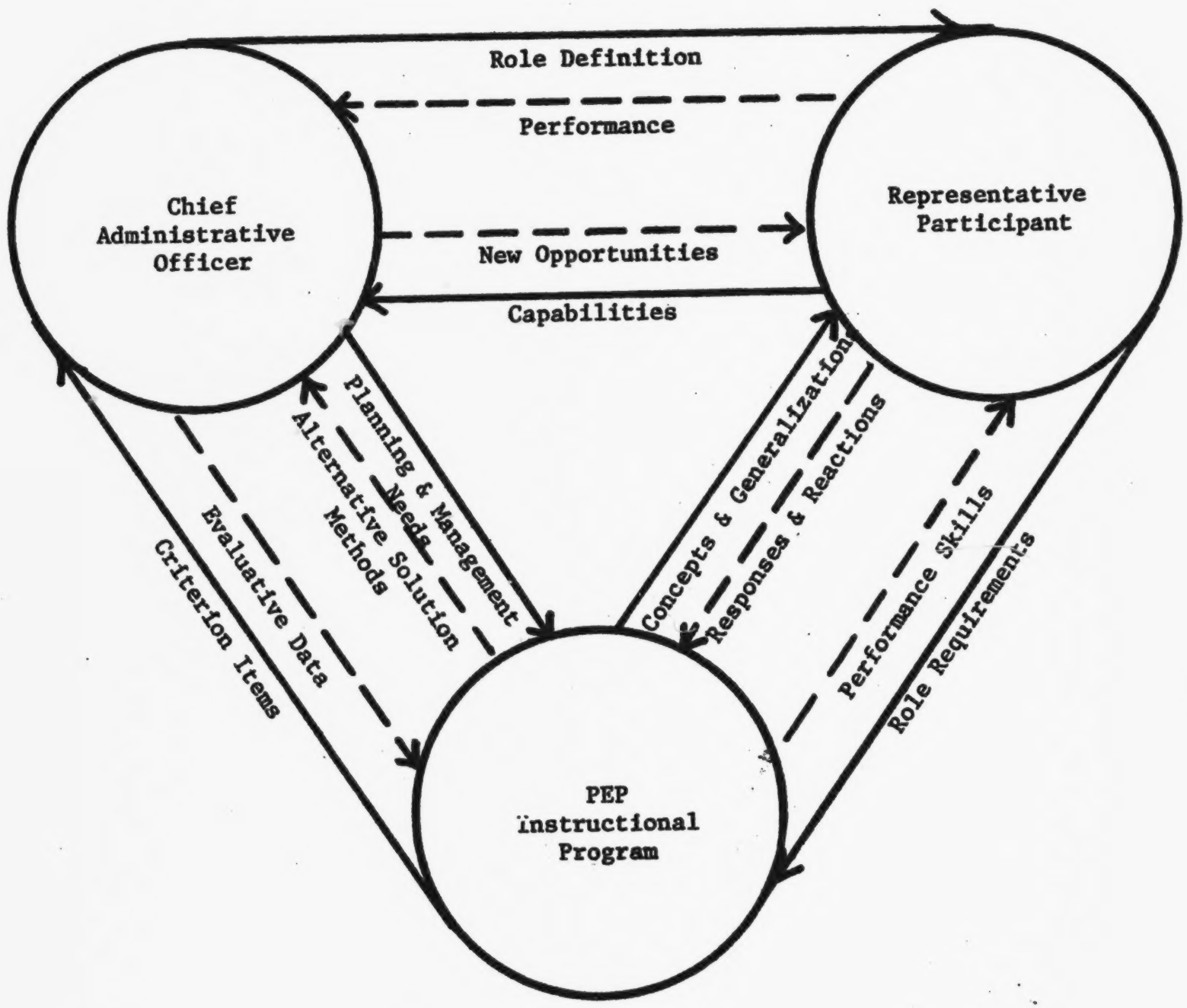
_____

_____

_____

FIGURE 3

A MODEL OF RELEVANT
INSTRUCTIONAL DESIGN RELATIONSHIPS
FOR OPERATION PEP



The model also facilitates information handling processes in that it reveals significant channels in the communication network which must be maintained in order that the instructional program can be designed to be maximally effective. The linkage between the project and the chief administrative officer is of particular significance, because it provides for the collection of both evaluative data and design criteria.

Soliciting and Recording Participants' Responses and Suggestions

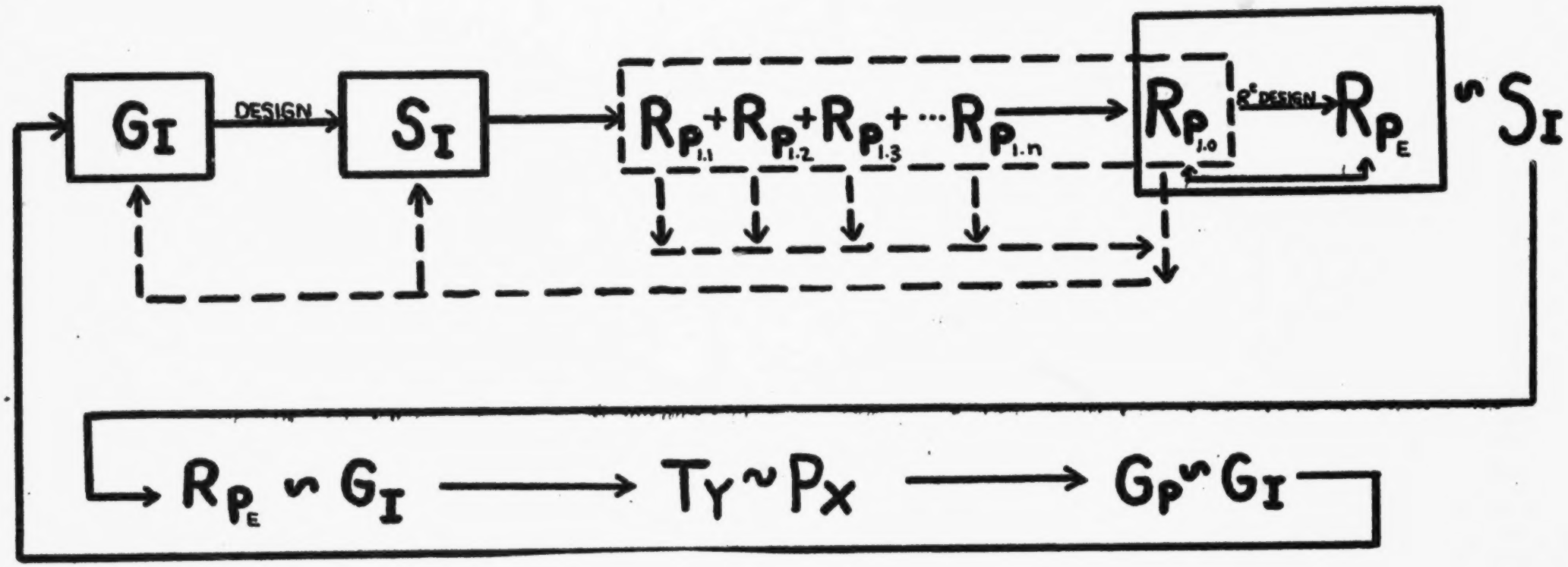
The development of an instructional program for educational planners and managers requires relevant data from those individuals actively involved in planning and managing roles. FIGURE 4 reveals the participant lesson response model which will be used to complete the design for the instructional program. The basic model format is replicated at the program level and serves as the program design and revision model (see FIGURE 5).

The most important feature of this model is the requirement that the goal of instruction (G_I) is to be made compatible with the goal of the participant (G_p). Realizing that there may be every dimension of incompatibility present at the outset of the instructional program, the project staff will be required to be responsive to the goal aspirations of the representative participants. This requirement must be fulfilled before the final design of the instructional program will reflect the "real-world" conditions of educational planning and management. Goal compatibility is an essential motivational condition for participant involvement in the design of the instructional program.

The goal of the instructional program (G_I) is to create an instructional program design which produces instructional stimuli (S_I) to which the participant can respond (R_p). Specially designed response forms will be provided each participant in order that his responses can be recorded as he actively reacts to the instructional materials. Each instructional component is assigned a reference number which can be

FIGURE 4

PARTICIPANT LESSON RESPONSE MODEL



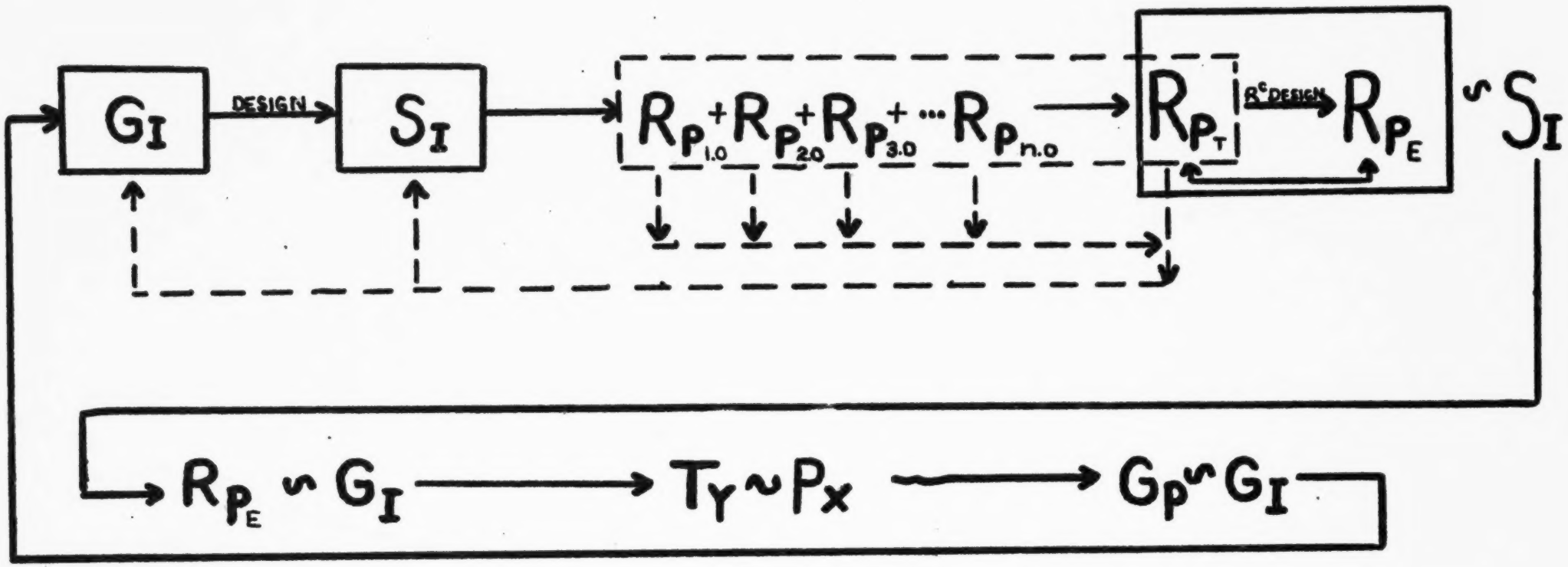
CODE

E = exhibited
S = stimulus
R = response
T = terminal performance
|
|
↓ = feedback
G = goal
G_I = instruction

S_I = stimulus instruction
↓ = yields, produces, leads to
R^C = response contingency
P = participant
I = instruction
~ = compatible
X = role requirement
Y = specifications

FIGURE 5

PROGRAM DESIGN AND REVISION MODEL



CODE

E = exhibited
S = stimulus
R = response
T = terminal performance
↓ = feedback
G = goal
G_I = goal instruction
S_I = stimulus instruction
↓ = yields, produces, leads to
R^C = response contingency
~ = compatible
P = participant
X = role requirement
Y = specifications

used to correlate individual reactions with instructional material components. By summarizing the reactions of all participants to individual reference numbers, critical revision information can be derived from the feed-back. In addition, a summary of an individual's response to the total lesson can be detailed ($R_{P_{1.0}}$).

Realizing that every participant should achieve at the expected level of performance in terms of pre-stated objectives, the effectiveness of a lesson and its context can be assessed. Should a participant fail to achieve at the expected level of performance, a contingency lesson featuring another context will be introduced (R^C). This contingency response situation will enable the participant to understand the principle presented in the lesson by allowing him to experience a new contextual situation.

A variety of response contingency situations must be developed for each lesson in the instructional program. This can only be done by the participants themselves, because they alone possess reliable information relative to the "real-world" situation. In its final form, the instructional program will feature more than one instructional path and, therefore, more individualization can be achieved in application.

Each contingency response situation serves to reinforce the participant's first response to the lesson. The provision of additional experiences with varying response contingency situations should enable each participant to realize the desired levels of performance (R_{P_E}). In every event the terminal exhibited response by the participant (R_{P_E}) must be compatible with the instructional stimuli (S_I).

In this way, the terminal response exhibited by the participant can be made compatible with the goal of instruction ($R_{P_E} \frown G_I$). This condition will produce basic compatibility between the terminal performance specifications and the participants' professional role requirements ($T_Y \frown P_X$). This in turn should lead to the establishment of the basic compatibility between the participant's goals and the goal of the instructional program ($G_P \frown G_I$).

When this pattern of relationships is viewed at the program level, individual lessons can be substituted for lesson components and thereby the terminal exhibited responses of the participants (R_{P_E}) become the terminal behavioral performance expected of each participant at the close of the instructional program. Response contingency situations can then be structured for lesson contexts which reflect the roles and conditions being experienced by educational planners and managers.

Thus, these models enable the project staff to develop responsive lesson components which reflect "real-world" conditions and assure a final program design which is more responsive to educational planning and management requirements.

EA

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